



MARKED-UP VERSION OF SPECIFICATION
APPLICATION NO. 09/467,174
FILED DECEMBER 20, 1999



- 1 -

TITLE

5 **APPARATUS FOR AND METHOD OF CONVERTING LOCATION
INFORMATION, AND COMPUTER PROGRAM PRODUCT THAT IS
USED THEREFOR**

BACKGROUND OF THE INVENTION

10 Field of the Invention

 The present invention relates to an apparatus for and a method of
converting location information, which is suitable for use in recording an image
picked up pickup by a camera and information indicating a pickup location thereof
15 into a recording medium, and to a computer program product that is used therefor,
such as a computer readable storage medium.

Description of the Related Art

 It is useful to record ~~the~~ information regarding the locations at where the
20 images are taken (including ~~the locations~~ location information such as a as latitude
~~and a~~ and longitude, a place name, such as an address, a name of a building, a
location name, such as a sightseeing place, ~~etc.~~ and the like ~~likes~~), together with the
images taken by a camera, when appreciating the images in a various ~~kind of~~ ways

thereafter, and thus there are proposed ~~the various kinds of~~ ideas for recording information regarding the locations at a time when taking the images.

For example, in Japanese Patent Laid-Open No. 6-110117, there is disclosed the invention in which a database for location information ~~and a~~ and selection means for selecting from the database location information with which an image is recorded, are provided in a camera, and desired location information is selected and operated by a photographer at a time of picture-taking, so as to record the location information on a photo film together with the image. Herein the location information is a so-called place name, and it is recorded on the photo film as character information.

Further, in Japanese Patent Laid-Open No. 4-70735, there is disclosed a camera in which two detecting means, such as ~~a~~ as detecting means in a positioning system ~~by a~~ by GPS (Global Positioning System), ~~and a~~ and detecting means of information from a system that provides location information that is characterized in a specific location or a region ~~in an~~ in a FM wave, are provided with the camera, and either one of the detected results of the two detecting means is recorded in a memory card along with an image taken in accordance with a predetermined order of priority.

Moreover, in Japanese Patent Laid-Open No. 8-36217, there is disclosed ~~disclosed a~~ detecting means of a positioning system ~~by~~ by a GPS to a camera, and a camera for recording detected location information along with an image on a photo film by encoding the detected location information, and an apparatus for printing converted information on a photographic print, or for displaying it on a TV monitor, as reproducing location information that is encoded from the photo film

after having been taken, and then converting it to information which is understandable by human beings, such as a place name, and the ~~likes~~ like by collating it with a database.

Information for a location associated with an image (hereinafter, it is referred to as location information) could be utilized in a variety of ways in accordance with an appreciation aspect of an image. For example, it is considered that a picture-taking location may be clarified by printing it with an image on a photographic print, or by displaying it with an image on a TV or a CRT monitor. In this case, it is preferable that, as the information for the location, the place name, the location name and the like ~~likes~~ are displayed as character information.

In an academic usage and the like ~~likes~~, it is preferable that the latitude and longitude information based on the detected results of the positioning means using the GPS are recorded as they are, and are displayed along with the image.

Further, in a usage that facilitates ~~to facilitate~~ an image retrieval ~~retrieve~~ for each of the picture-taking locations by constructing an image database within a computer, it is convenient to provide a code list in which the predetermined codes are provided for each of the locations, and to record the location information with these codes. This is because it ~~is~~ makes possible to make a memory capacity for recording or for storing to ~~be~~ be a relatively small with the codes, and it ~~is~~ makes possible to construct a system having a compatibility among the various kinds of application software, by unifying the code lists.

Also, obviously, it is preferable that the location information can be obtained and recorded easily, without performing an extra operation at a time when picture-taking.

In the above-mentioned Japanese Patent Laid-Open No. 6-110117
~~6-11011~~, it is inconvenient to do ~~since~~ the operation of selecting the desired
location information from the database for the location information at a time of
picture-taking, and also the database for the location information is required to
5 have a very large memory capacity ~~as~~ considering one camera is to be used all over
the world, and thus it has a disadvantage as to not be practical ~~enable~~ to install it in
a camera ~~in a practical scope in fact~~. Also, it has a disadvantage as to enable one to
manipulate only the character information for the place name or the location name,
and thus it is not suitable for a wide range of usage.

10 Further, in the above-mentioned Japanese Patent Laid-Open No. 4-70735,
~~it is the one in which~~ information for a location is recorded automatically at a time
of a picture-taking, but the information to be recorded along with the image is only
one kind that is determined by a predetermined order of priority, and thus it has a
disadvantage as to be not suitable for a wide range of usage.

15 Moreover, in the above-mentioned Japanese Patent Laid-Open No.
8-36217, encoded location information that is recorded automatically by a camera
is converted by a second apparatus having a database of location information to
information which is understandable by a human being, and then is displayed and
printed along with an image, but it enables one to manipulate only character
20 information, such as a place name, ~~and~~ a location name and the like ~~likes~~, and as a
result it has a disadvantage as not enabling one to deal with a wide range of usage.
Further, the location information recorded on a photo film along with an image is
only encoded information, and thus it has ~~a~~ an disadvantage of as not enabling
one to transmit ~~the~~ character information, such as the place name, the location

name and the like, ~~likes~~ that are obtained from the database to a third apparatus, and of as not enabling one to reuse them.

SUMMARY OF THE INVENTION

5 Accordingly, it is an object of the present invention to provide an apparatus for enabling one to deal with location information associated with an image of picture-taking, to a wide range of usage, by inputting the location information associated with the image of picture-taking, and by converting the input ~~inputted~~ location information to a plurality of signals in different
10 representation forms.

 It is another object of the present invention to provide a method for ~~processing of enabling to deal with~~ location information associated with an image of picture-taking, in ~~to~~ a wide range of usage, by inputting the location information associated with the image of picture-taking, and by converting the input ~~inputted~~
15 location information to a plurality of signals in different representation forms.

 It is yet another object of the present invention to provide a computer program product which is able to process ~~enable to deal with~~ location information associated with an image of picture-taking, in ~~to~~ a wide range of usage, by inputting the location information associated with the image of picture-taking, and
20 by converting the input ~~inputted~~ location information to a plurality of signals in different representation forms.

It Accordingly, it is an another object of the present invention to provide an apparatus that processes ~~for enabling to deal with~~ location information associated with an image of picture-taking, to in a wide range of usage, by

inputting, as original information, the location information associated with the image of picture-taking from an image recording medium into which the images of picture-taking are recorded, by converting the input ~~inputted~~ original information to ~~the~~ location information in a predetermined representation form, and by
5 recording the converted location information in the predetermined representation form into the image recording medium..

It is another object of the present invention to provide a method for processing of enabling to deal with location information associated with an image of picture-taking, in ~~to~~ a wide range of usage, by inputting, as original information,
10 the location information associated with the image of picture-taking from an image recording medium into which the images of picture-taking are recorded, by converting the input ~~inputted~~ original information to the location information in a predetermined representation form, and by recording the converted location information in the predetermined representation form into the image recording
15 medium.

It is yet another object of the present invention to provide a computer program product which is able to process ~~enable to deal with~~ location information associated with an image of picture-taking, in ~~to~~ a wide range of usage, by inputting, as original information, the location information associated with the
20 image of picture-taking from an image recording medium into which the images of picture-taking are recorded, by converting the input ~~inputted~~ original information to ~~the~~ location information in a predetermined representation form, and by recording the converted location information in the predetermined representation form into the image recording medium.

Further objects and advantages of the invention can be more fully understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

5

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram showing a configuration of a CRT monitor appreciation apparatus according to a first embodiment of the present invention;

Fig. 2 is an external view of the CRT monitor appreciation apparatus according to the first embodiment;

10 Fig. 3 is a configuration diagram showing the contents of a conversion table;

Fig. 4 is a flowchart showing an operation of the first embodiment;

Fig. 5 is a flowchart showing an operation of the first embodiment;

15 Fig. 6 is a configuration diagram showing a display example of the monitor;

Fig. 7 is a configuration diagram for illustrating a recording operation of the first embodiment;

Fig. 8 is a block diagram showing a configuration of a camera according to the first embodiment;

20 Fig. 9 is an external view of the camera according to the first embodiment;

Fig. 10 is a flowchart showing an operation of the camera according to the first embodiment;

Fig. 11 is a configuration diagram for illustrating a recording operation of the camera according to the first embodiment;

Fig. 12 is a flowchart showing an operation of a CRT monitor appreciation apparatus according to a second embodiment;

5 Fig. 13 is a block diagram showing a configuration of a CRT monitor appreciation apparatus according to a third embodiment;

Fig. 14 is a flowchart showing an operation of the third embodiment; and

Fig. 15 is a configuration diagram for illustrating a recording operation of the third embodiment.

10

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the following, the preferred embodiments of the present invention will be described in more detail with reference to the drawings.

Initially ~~At first~~, a first embodiment of the present invention will be
15 described.

Parts ~~First of all, it will describe about the parts~~ for detecting location information and for recording it as original information into a recording medium along with an image, will be described with reference to Figs. 8 to 11. Fig. 8 is a block diagram showing a configuration of a camera, Fig. 9 is an external view of
20 the camera, Fig. 10 is a flowchart showing an operation of the camera, and Fig. 11 is a diagram for illustrating a recording operation of the camera.

As shown in ~~In~~ Figs. 8 and 9, the camera 101 includes a numeral 101
~~denotes a camera, a numeral 102 denotes~~ a microprocessor 102 for controlling an operation of the camera, and in which a ROM and ROM, a RAM are installed, a

~~numeral 103~~ denotes a photo-metering circuit 103 (hereinafter, it is referred to as a metering circuit), ~~a numeral 104~~ denotes a distance-measuring circuit 104, a ~~numeral 105~~ denotes a shutter controlling unit 105, ~~a numeral 106~~ denotes an auto-focus controlling unit 106, ~~a numeral 107~~ denotes a display circuit 107 for driving a display device 108, ~~a numeral 109~~ denotes a clock circuit 109 for counting a date and date, a time automatically, ~~a numeral 110~~ denotes a data storing circuit 110 for temporarily storing data ~~a data~~ to be recorded, ~~a numeral 111~~ denotes a feeding motor driving circuit 111 for driving a photo film F that is accommodated in a cartridge, through a feeding mechanism 112, and ~~a numeral 113~~ denotes a film feeding quantity detecting circuit 113 for detecting a perforation P (see Fig. 11) ~~that is provided~~ in the film F by driving a photo-reflector 114, and for detecting a feeding quantity of the film.

The camera 101 also includes ~~A numeral 115~~ denotes a magnetic recording/reproducing circuit 115 for recording ~~a magnetic~~ magnetic information ~~into onto~~ the film F through a magnetic head 116 or for reproducing the magnetic information recorded in the film F, ~~a numeral 117~~ denotes a positioning receiver 117 for receiving a radio wave of a GPS system, ~~a numeral 118~~ denotes and a receiving circuit 118 for driving the positioning receiver and for calculating a current position (the latitude and the longitude) from the radio wave being received.

The camera 101 further includes ~~A numeral 119~~ denotes a main switch 119 of the camera, ~~a numeral 120~~ denotes a shutter button 120, ~~a numeral 121~~ denotes a switch 121 ("switch 1") ~~switch 1~~ that closes at a first stroke of the shutter button 120, ~~a numeral 122~~ denotes ~~a switch 2~~ a switch 122 ("switch 2") that closes

at a second stroke of the shutter button 120, ~~a numeral 123 denotes~~ a positioning switch 123 for establishing whether a positioning by the positioning receiver 117 and the receiving circuit 118 should be implemented or not, ~~a numeral 124 denotes~~ a title switch 124 for selecting a title of an image, which is to be recorded with the
5 image, ~~a numeral 125 denotes~~ a DATE switch 125 for establishing whether a date and time should be recorded or not with the image, ~~a numeral 126 denotes~~ an aspect ratio switch 126 for selecting an aspect ratio of the image of the picture-taking, and ~~a L denotes~~ a picture-taking lens L.

Herein, the photo film F preferably is such that one in which a magnetic
10 recording layer that ~~is a~~ is optically transparent ~~optically and practically~~ is provided on a base surface side thereof (~~an a side~~ opposite side of an ~~the~~ emulsion painted surface), and it enables ~~the~~ magnetic recording and reproducing by the magnetic head from the base surface side of the film.

In the following, ~~an~~ operation of the camera will be described, based on
15 the flowchart of Fig. 10. When the main switch 119 of the camera is turned ON, then ~~at~~ at a step S101 (hereinafter, the word "step" ~~of step~~ is omitted) it is determined whether ~~a the~~ first stroke of the shutter button 120 is performed, ~~pressed or not~~, i.e., whether the switch 121 ("switch 1") is closed (ON) or not, and processing is held in a loop it holds if it is not ON, but processing it proceeds to
20 S102 if it is ON. At S102, it is determined whether the positioning switch 123 is being set to ON or not, and then proceeding to S105 (bypassing S103 and S104) as bypassing 8103, 8104 if it is OFF, but proceeding to 8103 if it is ON.

At S103 the positioning receiver 117 is driven through the receiving circuit 118, ~~and then proceeding to 8104~~. At S104 a receiving radio wave of the

positioning receiver 117 is calculated in the receiving circuit 118, and ~~capturing a~~
latitude and longitude information that is a result of the calculation thereof is
captured, and after having been temporarily stored in the data storing circuit 110;
~~proceeding to S105~~. At S105 it is determined whether "record date and time" a
5 ~~record of a date and time~~ is indicated by the DATE switch 125, ~~or not, and~~
~~proceeding to S107 (bypassing S106)~~ as bypassing S106 if it is not so indicated,
but proceeding to S106 ~~S107~~ as capturing the current date and time into the clock
circuit 109 and temporarily storing it in the data storing circuit 110 if it is
so indicated.

10 At S107 it is determined whether "title record" ~~a title record~~ is indicated
by the title switch 124 ~~or not, and~~ proceeding to S109 (bypassing S108) ~~as~~
~~bypassing S108~~ if it is not so indicated, but temporarily storing at S108 the content
of the title being selected into the data storing circuit 110 and proceeding to S109 if
it is so indicated. At S109 the storing ~~he aspect ratio of the~~ image of
15 picture-taking that is selected by the aspect ratio switch 126 is stored into the data
storing circuit 110 ~~and proceeding to S110~~. At S110 ~~performing a metering of an~~
object of picture-taking is performed by the metering circuit 103, ~~and proceeding to~~
~~S111~~. At S111 ~~performing a distance-measurement of the object of picture-taking~~
is performed, ~~and proceeding to S112~~. At S112 it is determined whether the shutter
20 button 120 is pressed down to the second stroke thereof ~~or not~~, i.e., whether the
switch ~~2 of~~ 122 ("switch 2") is turned ON with processing ~~or not, and~~ returning to
S101 and then holding if it is turned OFF, but proceeding to S113 if it is turned ON.

At S113 ~~an operation of a~~ picture-taking operation is performed. That is,
an auto-focus control is performed by driving the picture-taking lens L through the

auto-focus controlling unit 106 based on the result of S111, and then an exposure to the film F is exposed ~~performed~~ by driving the shutter controlling unit 105 based on the result of S110.

Then, at S114 starts the film F ~~starting~~ a feeding to the next picture taking
5 frame of the film F by driving the feeding motor driving circuit 111, ~~and then~~
~~proceeding to S115.~~

At S115 ~~driving~~ the magnetic head 116 is driven through the magnetic recording/reproducing circuit 115, magnetically ~~magnetic~~ recording various kinds of segments of information that have been temporarily stored in the data storing
10 circuit 110 on the magnetic recording layer of the film F, ~~and then proceeding to~~
S116.

At S116 ~~S116~~ it is determined whether a ~~film~~ film feeding for one frame is completed by the photo-reflector 114 and the film feeding quantity detecting circuit 113, ~~and~~ waiting until to complete if it is not completed, but proceeding to
15 S117 and stopping the feeding motor ~~by~~ via the feeding motor driving circuit 117 if it has been completed. As a result, ~~a~~ the camera film feed operation for one frame is ~~to be~~ finished.

In the following a state of the magnetic record that is recorded on the film F at S115 will be described with reference to Fig. 11.

20 F1, F2, F3, . . . denote ~~denotes~~ the respective picture-taking frames, where
~~and~~ F1 denotes the ~~to be~~ a first frame. In this figure the first frame and ~~as~~
including the second frame they have been exposed ~~picture-taken~~, and the various kinds of segments of information corresponding to the respective frames have been recorded.

The information corresponding to the respective frames ~~is~~ are recorded as being separated in the first magnetic track T1 and the second magnetic track T2.

For the first frame F1, it becomes the first magnetic track T11, the second magnetic track T21, and for the second frame F2, it becomes the first magnetic track T12, the
5 second magnetic track T22. Two magnetic tracks are respectively recorded by the first channel 116a and the second channel 116b of the magnetic head 116.

As ~~being enlarged~~ exemplified in enlarged from for the first frame 1, the order of recordings of the first magnetic track T1 is arranged by an SS (Start Sentinel) information indicating a beginning of the information, ID1 information
10 indicating an ID of the date and time information, an actual date and time data ~~date~~ following thereafter ~~thereto~~, ID2 information indicating an ID of ~~of~~, aspect ratio information, the ~~an~~ actual aspect ratio data following thereafter ~~thereto~~, ID3 information indicating of an ID of title information, an actual title data following thereafter ~~thereto~~, and ES (End Sentinel) information indicating an end of the
15 information.

The order of recordings of the second magnetic track T2 is arranged by an SS ~~a-SS~~ indicating a beginning of the information, ID4 information indicating ~~that~~ ~~it is~~ location information detected by the positioning means, and is latitude and longitude information (original information) that is recorded in a latitude and
20 longitude form, with ~~an~~ actual latitude and longitude data ~~date~~ (original information data) following thereafter ~~thereto~~, and ES information indicating an end of the information.

Herein, the original information is location information and the like ~~likes~~ that are recorded at a time of picture-taking, and represents the location

information that is already recorded in a recording medium along with an image, when a recording medium such as a photo film and the like ~~likes~~ is loaded in a recording apparatus to be described below.

In the following, a recording apparatus according to the preferred
5 embodiment of the present invention will be described with reference to Figs. 1 to 7.

Fig. 1 is a block diagram showing a configuration of the CRT monitor appreciation apparatus that is the recording apparatus, Fig. 2 is an external view, Fig. 3 is a diagram for illustrating the contents of the conversion table in Fig. 1,
10 Figs. 4 and 5 are flowcharts for illustrating the operation of the CRT monitor appreciation apparatus, Fig. 6 is a diagram for illustrating a display example on the CRT monitor, and Fig. 7 is a diagram for illustrating a recording operation of the appreciation apparatus.

As shown in ~~In~~ Figs. 1 and 2, ~~a numeral 1 denotes~~ a CRT monitor appreciation apparatus 1 includes, ~~a numeral 2 denotes~~ a main body 2, ~~of the CRT monitor appreciation apparatus~~, ~~a numeral 3 denotes the~~ a CRT monitor 3, a numeral ~~4 denotes~~ a mouse 4 for implementing various kinds of inputs, a numeral ~~5 denotes~~ a keyboard 5, a letter ~~C denotes~~ and a film cartridge C in which the photo film F having a magnetic recording layer is installed. The photo film F is already
20 exposed picture-taken, and ~~is already developed~~, thereby containing existing an image that is clearly imaged. Further, the information that is magnetically magnetic recorded on the film at a time of the exposure/picture-taking remains in the state as it is.

The CRT monitor appreciation apparatus includes ~~A numeral 5~~ denotes a microprocessor MP for controlling an operation of the appreciation apparatus, the microprocessor being that is provided within the main body 2, and having a ROM and a RAM in which a ROM, a RAM are installed therein. The CRT apparatus
5 also includes ~~A numeral 6~~ denotes an illumination driving circuit 6 for illuminating an image on the film F by driving an illumination light source 7, ~~A numeral 8~~
~~denotes~~ an illumination box 8 for obtaining a uniform illumination, ~~a numeral 9~~
~~denotes~~ an optical system 9 for image-forming an image from on the film F onto a CCD 10, ~~a numeral 16~~ denotes a CCD driving circuit 16, ~~a numeral 11~~ denotes and
10 an image processing circuit 11 for implementing a white balance adjustment, an exposure compensation based on the exposure data inputted input from the key board 5 and the 4, the mouse 4 3, a color compensation, an a superimposition
addition of a superimpose of various kinds of segments of information and the like
likes, and for causing the CRT monitor 3 to display the last image.

15 The CRT monitor appreciation apparatus 1 also includes ~~A numeral 12~~
~~denotes~~ a photo-reflector 12, which detects barcode information that is clearly imaged on the film F, a F. ~~A numeral 13~~ denotes film information detecting circuit 13, which reads a maker name, a classification and the like ~~likes~~ of the film according to the barcode information detected by the photo-reflector 12, and inputs
20 them to the microprocessor MP, ~~microprocessors 5~~. ~~A numeral 14~~ is another photo-reflector 14, which detects the perforation P on the film F, and F. ~~A numeral~~
~~15~~ denotes a film feeding quantity detecting circuit 15, which detects a feeding quantity of the film according to the perforation signal detected by the photo-reflector 14, and inputs it to the microprocessor MP ~~microprocessors 5~~.

The CRT monitor appreciation apparatus 1 further includes ~~A numeral 17~~
denotes a feeding motor driving circuit 17, which performs a feeding of the film F
through a feeding motor (not shown), and a feeding mechanism 18, 18. ~~A numeral~~
~~19~~ denotes a reproducing head 19, and ~~a numeral 20~~ denotes a magnetic
5 reproducing circuit 20, which performs a reproduction of the information that is
magnetically magnetic recorded on the film F, F. ~~A numeral 20~~ denotes a
recording head 21, and ~~a numeral 21~~ denotes a magnetic recording circuit 22,
which performs an additional recording of new information to the film F and a
re-recording of the information in which a content thereof is modified.

10 The CRT monitor appreciation apparatus 1 still further includes ~~A~~
~~numeral 23~~ denotes a cartridge detecting switch 23, which detects whether a film
cartridge C is loaded in the main body 2 or not, and inputs it to the microprocessor
MP, microprocessors 5. ~~A numeral 24~~ denotes a main switch 24, ~~a numeral 25~~
~~denotes~~ a feeding switch 25 that indicates one frame feeding of a film, ~~a numeral~~
15 ~~26~~ denotes a rewind switch 26 that indicates a rewind of a film, ~~a numeral 27~~
~~denotes~~ an ejector injector switch 27, which is mechanically switched ~~a mechanical~~
~~switch~~ at a time when the film is ejected, and injecting a film. ~~A numeral 28~~
~~denotes~~ a conversion table 28, which is a storage device in which a corresponding
table of the information in the various kinds of forms for the locations is recorded.

20 Herein, a content of the conversion table 28 will be described, based on
the example in Fig. 3.

The conversion table 28 ~~is the one which~~ relates the latitude and longitude
information recorded in the latitude and longitude recording form applicable to the
original information, the place name, location name as the character information

recorded in the corresponding character recording form, and the barcode number as the code information recorded in the code recording form, one-by-one.

It is preferable that the above-mentioned three kinds of recording forms of the information are determined with the most suitable forms to the respective
5 information. In Fig. 3, it is set that the original information (the latitude and longitude information) is in a form of the latitude and the longitude being recorded identifiably, the character information is in a form of being recorded with the character string using the character set defined by the ISO646 and the like likes, and the code information is in a form being recorded with the numerical string.

10 Returning to Fig. 1, a numeral 29 denotes a selection switch, that is a switch for selecting either a first recording form (the place name, location name that are the character information) that is obtained through the conversion table 28 from the original information for the location (the latitude and longitude information) or a second recording form (the code numbers that are the code
15 information).

In the following, an operation of the CRT monitor appreciation apparatus will be described, based on the flowcharts in Figs. 4 and 5.

When the main switch 24 is turned ON, at step S10 it is determined whether the cartridge C is loaded or not according to a state of the cartridge
20 detecting existing/non-existing switch 23, and holding if it is not loaded, but proceeding to S11 if it is loaded. At S11 ~~driving~~ the CCD 10 is driven by ~~through~~ the CCD driving circuit 16, ~~and then proceeding to S12~~. At S12, ~~driving~~ the light source 7 is driven by ~~through~~ the illumination driving circuit 6, ~~and then proceeding to S13~~. At S13, ~~rotating~~ the feeding motor is rotated by ~~through~~ the

feeding motor driving circuit 17, starting a feeding of the film F, ~~and then~~
proceeding to S14.

At S14, the information of the film maker name, the film classification,
the number of picture-taking frames and the like ~~likes~~ are read from the barcode
5 information on the film F by the photo-reflector 19 and 19, ~~and~~ the film
information detecting circuit 13, ~~and then proceeding to S15~~. At S15,
reproduction ~~a reproduction~~, decoding and storing operations of the information
that is magnetically ~~magnetic~~ recorded on the film F are performed by the
reproducing head 19 and the 19, ~~the~~ magnetic reproducing circuit 20, ~~and then~~
10 ~~proceeding to S16~~. At S16, it is determined whether the beginning of the first
picture-taking frame of the film F is completed or not, by the photo-reflector 14
and the film feeding quantity detecting circuit 15, ~~and~~ waiting for the completion if
it is not completed, but proceeding to S17 if it is already completed.

At S17, driving of ~~stopping~~ the feeding motor is stopped, ~~and then~~
15 ~~proceeding to S18~~. At S18, it is determined whether the rewind switch 26 is
turned ON or not, and if it is turned ON, then ~~reversing~~ the feeding motor is
reversed at S19, ~~and~~ after having ~~been~~ waited for ~~for a~~ completion of a rewind of
the film at S20, ~~stopping the feeding motor is stopped~~ at S21, ~~and rejecting the~~
cartridge C is ejected at S22, and the process ends then ~~finishing~~. On the other
20 hand, if the rewind switch 26 is not turned ON at S18, the process proceeds
~~proceeding to S23~~. ~~At S23, performing a~~ and picture-taking of an image is
performed by the CCD 10 and CCD10, ~~the CCD driving circuit 16, and then~~
~~proceeding to S24~~. At S24, S25, ~~performing a~~ white balance adjustment of the
image by the image processing circuit 11, ~~an~~ exposure compensation based on ~~an~~

exposure compensation data ~~inputted~~ input from the keyboard 4 and the ~~4~~, the mouse 3, and ~~and~~ a color compensation and the like are performed ~~likes~~, and then proceeding to at S25 ~~and performing~~ a display of the image is performed by the CRT2.

5 Then, proceeding to S26, ~~and~~ it is determined whether the original information (the latitude and longitude information) that is the local information is to be included or not among the magnetic information read by the magnetic reproducing circuit 20, and proceeding to S29 ~~as (bypassing the S27 and S28)~~ if it is not included, but proceeding to S27 if it is included. At S27 ~~determining~~ the character information (place name, location name) and the code information (code number) corresponding to the original information that is recorded, is determined by retrieving the conversion table 28, ~~and then proceeding to S28~~. At S28, displaying the determined character information and the code information are as ~~being~~ superimposed with the original information on the CRT 2 through the image processing circuit 11. Then, at S29, ~~superimposing the~~ information other than the location information is superimposed thereon.

10

15

Fig. 6 shows a display example of the CRT monitor 2 at that time, where ~~and there are displayed~~ the date and time information 2a, the aspect ratio information 2b, the title information 2c, the latitude and longitude information 2d that is the original information of the location information, and the character information 2e that is selected as the retrieval result and the code information 2f and displayed. Next, at S30 it is determined whether the character information or the code information is selected by the selection switch 29, and at S31 and S32 ~~S31, S32 storing the~~ selected information is stored ~~that are the ones selected, and~~

20

~~then proceeding to S33.~~ In the CRT monitor, it makes possible to confirm which information is selected with the selection marks of 2g, 2h in Fig. 6.

At S33, it is determined whether the feeding switch 26 is turned ON or not, ~~and~~ returning to S30 if it is not turned ON, but proceeding to S34 if it is turned ON. At S34, ~~starting a film feeding~~ is started by rotation-driving the feeding motor, ~~and then proceeding to S35.~~ At S35, ~~magnetic recording of the location information that is stored at S31 or at S32~~ is magnetically recorded on a film by the recording head 21 and 21, ~~the magnetic recording circuit 22, and then proceeding to S36.~~ At S36, ~~as similar to S15, performing the reproducing, decoding, and~~ storing operations for the magnetic information that is recorded on the next picture-taking frame are performed, ~~and then proceeding to S37.~~ At S37, it is determined whether ~~a film~~ film feeding for one frame is completed or not, ~~and waiting for~~ for a completion if it is not completed, but proceeding to S38 if it is completed.

At S38, it is determined whether a last frame of a film is completed or not, returning to S17 if it is not completed, and performing the operations that are similar to the ones described as above. ~~If Proceeding to S18~~ if it is determined that the operation of the last frame is completed at S38, ~~and performing an operation of~~ a rewind operation of the film is performed at S19.

Now, this it will describe a state of a magnetic recording that is recorded on the film F at S35, with reference to Fig. 7, which ~~7. Herein~~, it shows a case in which the character information that is recorded in the character form is selected as the location information at S30. Further, for the same elements in Fig. 11, the same symbols are attached thereto and the descriptions thereof are omitted.

Since the recorded content of the first magnetic track T1 is not changed, it becomes the same as the one at a time of picture-taking (Fig. 11). The recorded content of the second magnetic track is such that the location information is changed and re-recorded from the original information to the character information, and the order of this recording becomes as a SS (Start Sentinel), ID5 information indicating ~~of being~~ the character information that is recorded in ~~the~~ character form, followed by the character information data, and an ES (End Sentinel) indicating an end of the information.

When the code information is selected as the location information at step 10 S30, instead of the ID5 information, ID6 information indicating ~~of being~~ the code information which is recorded in ~~in a~~ code form that is to be the location information, and instead of the character information data, the code number data are respectively recorded.

In the present embodiment, it is ~~makes~~ possible to obtain the character information or the code information, to ~~of~~ which the original information as ~~being~~ the location information is converted, and to re-record this on the film in place of the original information. Further, desirable information can be recorded selectively from the character information and the code information.

In the following, the second embodiment will be described.

20 A configuration of the CRT monitor appreciation apparatus in the present embodiment is the same as in Fig. I, and it is assumed to adopt this, but it differs from the first embodiment in such a point that for the location information, the original information can be selected in addition to ~~besides~~ the character ~~information;~~ information and the code information by the selection switch 26.

Fig. 12 is a flowchart for illustrating an operation of the present embodiment, and is comparable equivalent to Fig. 5 of the first embodiment. In embodiment, and in Fig. 12, the same step numbers are attached to the steps that are the same as in ~~the ones in~~ Fig. 5.

- 5 S30 in Fig. 5 is equivalent to S50 in Fig. 12. At S50, it is determined whether the original information (the latitude and longitude information as being recorded in the latitude and longitude form), the character information, or the code information is selected by the selection switch 26, and proceeding to S51 and storing the original information if the original information is selected, but
- 10 proceeding to S31 and storing the character information if the character information is selected, or proceeding to S32 and S33 after storing the code information if the code information is selected. Thereafter, the similar operations as the ones in the first embodiment are performed.

- In the present embodiment, it is makes possible to retain the original
- 15 information on the film as it is, other than only the converted information such as the character information information, and the code information.

In the following, the CRT monitor appreciation apparatus according to the third embodiment will be described with reference to Figs. 13 to 15.

- Fig. 13 is a configuration diagram, and the same numbers number are
- 20 attached to the elements that are the same as the ones in Fig. 1. It differs from Fig. 1 in the point such that the selection switch 29 is not provided, but instead ~~thereof~~ there are provided three switches: an of the original information switch 51 for indicating a record of the original information (the latitude and longitude information in the present embodiment), the a character information switch 52 for

indicating a record of the character information, and ~~a the~~ code information switch 53 for indicating a record of the code information. It is arranged such that the three switches can be set ~~made a setting of~~ ON/OFF individually, that is, it ~~can be made~~ is possible to select a setting of an indication/no-indication of a record for each

5 information.

Fig. 14 is a flowchart for illustrating the operations, and the same step numbers are attached to the operations that are the same as the ones in Fig. 5.

Proceeding from S29 in Fig. 4 according to the first embodiment, at S60, it is determined whether the original information switch 51 is turned ON or not,

10 ~~and~~ proceeding to S61 ~~as (bypassing S62)~~ if it is not turned ON, but proceeding to S61 if it is turned ON. At S61, ~~storing~~ the corresponding original information (the latitude and longitude information) is stored, ~~and~~ proceeding to S62. At S62, it is determined whether the character information switch 52 is turned ON or not, ~~and~~ proceeding to S64 if it is not turned ON, but proceeding to S63 if it is turned ON.

15 At S63, ~~storing~~ the corresponding character information (the place name, the location name) is stored, ~~and proceeding to S64~~. At S64, it is determined whether the code information switch is turned ON or not, ~~and~~ proceeding to S66 if it is not turned ON, but proceeding to S65 if it is turned ON. At S65, ~~storing~~ the corresponding code information (the code number) is stored ~~and proceeding to~~

20 S66. At S66, it is determined whether the feeding switch 25 is turned ON or not, ~~and~~ returning to S60 if it is not turned ON, but proceeding to S34 if it is turned ON. It will be the same operations as in Fig. 5 after S34, and at S35, the location information being stored at S60 to S65 are magnetically ~~magnetic~~ recorded on the film.

construction and operation are not critical to the operation or best mode for carrying out the invention.

While the present invention has been described with respect to what is presently considered to be the preferred embodiments, it is to be understood that
5 the invention is not limited to the disclosed embodiments. To the contrary, the invention is intended to cover various modifications and equivalent arrangements included within the spirit and scope of the appended claims. The scope of the following claims is to be accorded the broadest interpretation so as to encompass all such modifications and equivalent structures and functions.

10 For example, in the embodiments described ~~as~~ above, the images associated with the location information are the picture-taking images, but the present invention is applicable to ~~the~~ images other than ~~the~~ picture-taking images.

Further, in the third embodiment, when the latitude and longitude information that is the original information is selected, it is arranged to re-record
15 this information, but it may be arranged to use the recorded original information as it is, so as to not re-record.

Moreover, in the first to ~~the~~ third embodiments, ~~it is illustrated for the a~~
photo film having ~~the a~~ magnetic recording layer as the recording medium for recording the image and the location information is illustrated, but it is not limited
20 thereto. ~~A There are a~~ memory card, a floppy disk and the like are ~~likes as the~~ suitable ~~ones of~~ other recording media. In these cases, it is easy to modify the CRT appreciation apparatus and the camera to the structures suitable for these recording media.

10, 12, 14 described above, and it constitutes a computer program product for providing the program.

Moreover, as this recording medium, a semiconductor memory such as a ROM, a RAM and the like ~~likes~~, an optical disk, a magneto-optical disk, and a
5 magnetic recording medium and the like ~~likes~~ may be used, and they may be constituted as a CD-ROM, an FD ~~a FD~~, a magnetic card, a magnetic tape, a non-volatile memory card and the like ~~likes~~.

Accordingly, by using this recording medium in another ~~other~~ system or an apparatus other than the systems according to the above-mentioned respective
10 embodiments, and as the system or the computer reads and performs the program codes stored in the recording medium, it implements ~~enables to implement~~ the functions and effects that are equivalent to the ones in the respective embodiments described as above, thereby achieving the objects of the present invention.

Further, when the OS and the like ~~likes~~ running on the computer perform
15 a portion of or all of the processes, or after the program codes read from the recording medium are written into a memory that is provided in an extension board inserted into the computer or in an extension unit connected to the computer, and when the CPU and the like ~~likes~~ provided in the above-mentioned extension board or extension unit perform a portion of or all of the processes based on the
20 instructions of the program codes, it implements ~~enables to implement~~ the functions and effects that are equivalent to the ones in the respective embodiments described as above, thereby achieving the objects of the present invention.

Moreover, the present invention is such that the technical elements of the embodiments as described above may be combined as required.

Further, the present invention is such that a portion of or all of the constituents of the claims or of the embodiments may form one apparatus, or may be combined ~~combine~~ with another ~~other~~ apparatus, or may be ~~the one as being~~ an element constituting an apparatus.

ABSTRACT OF THE DISCLOSURE

An apparatus for, a method of, and a computer program product for
processing of enabling to deal with location information associated with an image
5 of picture-taking, in to a wide range of usage, by inputting inputs the location
information associated with the image of picture-taking, and by converting the
inputted converts the input location information to a plurality of signals in different
representation forms are provided.

10 CPW\gmc\eyw

DC_MAIN 136802v1